Curriculum Vitae

Guilherme Lima

December 2016

Personal Data

Full Name:	**José Guilherme Lima**
Citizenship:	American, Brazilian
Mailing Address:	107 Woodland Circle
	North Aurora, IL 60542 – USA
Contact:	Phone: 630-252-4831 Email: `lima@fnal.gov`

Education

Ph.D. in Experimental High Energy Physics, CBPF, Brazil, 1995.
Thesis: *Study of the Inclusive Muon Production Cross Section at Small Angles in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV*
Advisor: Alberto F. Santoro Co-advisor: Arthur K. Maciel

M.Sc. in Experimental High Energy Physics, CBPF, Brazil, 1991.
Thesis: *Experimental analysis of doubly Cabibbo-suppressed decay $D^+ \to \phi K^+$*
Advisor: Alberto F. Santoro Co-advisor: Ignacio Bediaga

B.S. in Physics, Universidade Federal do Pará, Brazil, 1988.

Employment History

09/13-current:	Applications Physicist, Fermilab, Batavia, IL (USA)
12/03-09/13:	Research Associate, Northern Illinois University, Dekalb, IL (USA)
05/03-12/03:	Visiting Assistant Professor, Northern Illinois University, Dekalb, IL (USA)
10/98-10/00:	Guest Scientist, Particle Physics and Computing Divisions, Fermilab (USA)
03/96-08/03:	Professor at the Nuclear and High Energy Physics Department (DFNAE), State University of Rio de Janeiro (UERJ), Brazil
08/95-03/96:	Visiting Professor at the DFNAE, State University of Rio de Janeiro (UERJ), Brazil
10/91-10/93:	Guest Scientist, Particle Physics Division, Fermilab, USA. 1991-1993

Current and past interests

- **Parallel computing and multi-thread applications in HEP**

  A new paradigm is emerging in the field of High Performance Computing for scientific applications, with the development of parallel computing through SIMD vectorization, multi-threading, multi-cores, GPGPUs, etc. Taking full advantage of the new architectures requires a fresh look at the implementation of HEP tools and frameworks. I am part of the GeantV project, which has been developing simulations tools designed with micro-parallelization in mind. The first prototype and the first serious performance comparisons are to be delivered in 2016.

- **Simulation tools for detector R&D**

  The Technical Design Report for a future Linear Collider has been concluded, and the International Linear Collider (ILC) could be operational around 2030, with the purpose of exploring Physics beyond the Standard Model in complementarity to the LHC experiments. I was deeply involved in the CALICE Collaboration and the SiD/ILC detector study group, at the time when Fermilab was the main candidate to host the ILC project. Beautiful CALICE results are significantly improving the quality of hadronic shower modeling.

- **Search for charged Higgs bosons in $pp \to \tau + \text{jets} + E_{T_{\text{miss}}}$ data at the LHC**

  The analysis of final states containing τ leptons is very important for a number of possible scenarios beyond the Standard Model. In particular, for the search of charged Higgs bosons at the LHC, final states containing τs are dominant for large values of $\tan\beta$.

- **Particle flow and high-granularity calorimetry**

  The clever use of particle flow algorithms and the high-granularity calorimeters of the future experiments will allow unprecedent jet energy resolutions and the use of shower shapes for parton identification. Current prototyping of this technology in the CALICE Collaboration is already improving the modeling of hadronic showers for all relevant particles and large energy ranges.

- **The Intensity Frontier**

  The search for new physics phenomena is fascinating. I believe the experiments at the Intensity Frontier are in a very good position to uncover the next secrets of Nature, and Fermilab is one of the leading drivers in this field over the next two decades.

- **Grid computing**

  Distributed computing power and data storage is made available worldwide today, through very fast links and Grid-enabled software. The Grid developments promote stronger collaboration and contributions from worldwide institutions in the computing tasks and needs, not only of future HEP experiments, but also many other fields where significant advances can be achieved if only more computing power becomes available for research.

Talks presented

Invited Lectures

1. "Detector simulations at NICADD/NIU", ICAR Workshop (Illinois Consortium for Accelerator Research), Argonne, Chicago, May 2004.
2. "Experimental Methods of High Energy Physics", 4 one-hour lectures presented at the session B of the *V Lafex International School on High Energy Physics*, Rio de Janeiro (Brazil), February 2002.
3. "Perspectives for the DØ Experiment" (translated title) – Colloquium at the Physics Institute/UERJ, Rio de Janeiro (Brazil), 24/jan/2001;
4. "Generalities about experimental high energy physics" (translated title) – Colloquium at the Physics Dept., UFJF, Juiz de Fora (Brazil), 22/jun/1995;
5. "What is experimental high energy physics?" (translated title) – Colloquium at the Physics Dept., UFPa, Belém (Brazil), 06/jan/1994;

Presentations at Conferences

1. "Update on the combined analysis of 2007 test beam data", *CALICE Workshop at Argonne*, Argonne (IL), March 2008;
2. "TCMT software status", *CALICE Workshop at Argonne*, Argonne (IL), March 2008;
3. "A preliminary analysis of the CALICE test beam data", *SiD Workshop at Fermilab*, Batavia (IL), April 2007;
4. "PFA reconstruction with directed tree clustering" (presented by D. Chakraborty), *Vancouver Linear Collider Workshop (VLCW'06)*, Vancouver, Canada, July 2006;
5. "Particle flow reconstruction based on the directed tree clustering algorithm", *2006 Conference on Calorimetry in High Energy Physics (CALOR'06)*, Chicago (IL), June 2006;
6. "Digitization framework for the Calice test beam", *CALICE Collaboration Meeting*, Montrèal, Canada, May 2006;
7. "A digitization simulation package for the ILC and the CALICE test beam", *CALICE Collaboration Meeting and ILC Simulations Workshop*, DESY,Hamburg, Germany, December 2004;
8. "Status report on simulation tools at NIU", *American Linear Collider Workshop*, University of British Columbia, Victoria, Canada, July 2004
9. "Vertex reconstruction at the DØ Experiment", *XXII Encontro Nacional de Física de Partículas e Campos*, São Lourenço (MG), Brazil, October 2001;

Selected Publications

1. **GeantV: from CPU to accelerators**, GeantV Collaboration (G. Amadio *et.al.*), *J.Phys.Conf.Ser.* **762**: 012019 (2016)

2. **Electromagnetic Physics Models for Parallel COmputing Architectures**, GeantV Collaboration (G. Amadio *et.al.*), *J.Phys.Conf.Ser.* **762**: 012014 (2016)

3. **The GeantV project: preparing the future of simulation**, GeantV Collaboration (G. Amadio *et.al.*), *J.Phys.Conf.Ser.* **664**: 092013 (2015)

4. **Towards a high-performance geometry library for particle-detector simulations**, GeantV Collaboration (J. Apostolakis *et.al.*), *J.Phys.Conf.Ser.* **608**: 012023 (2015)

5. **Search for charged Higgs bosons decaying via $H^+ \to \tau\nu$ in top quark pair events using pp collision data at $\sqrt{s} = 7$ TeV with the ATLAS detector**, ATLAS Collaboration (G. Aad *et.al.*), *JHEP* **1206**: 039 (2012)

6. **Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC**, ATLAS Collaboration (G. Aad *et.al.*), *Phys. Lett. B* **716**: 1 (2012)

7. **Hadronic energy resolution of a highly granular scintillator-steel hadron calorimeter using software compensation techniques**, CALICE Collaboration (C. Adloff *et.al.*), *JINST* **7**: P09017 (2012)

8. **Calorimetry for Lepton Collider Experiments – CALICE results and activities**, CALICE Collaboration (C. Adloff *et.al.*), *arXiv:1212.5127 [physics.ins-det]* (2012)

9. **The status of the simulation project for the ATLAS experiment in view of the LHC startup**, Atlas Collaboration, (G. Aad *et.al.*), *J. Phys. Conf. Ser.* **219** 032060 (2010)

10. **Directly Coupled tiles as elements of a scintillator calorimeter with MPPC readout**, G. Blazey *et.al.*, *Nucl. Instr. and Meth.* A **605**: 277 (2009)

11. **ILC Reference Design Report Volume 4 - Detectors**, ILC Collaboration (T. Behnke *et.al.*), *arXiv:0712.2356 [physics.ins-det]* (2007)

12. **Particle flow reconstruction based on the directed tree clustering algorithm**, D. Chakraborty, J.G.R. Lima, R. McIntosh and V. Zutshi (CALOR 2006), *AIP Conf. Proc.* **867**: 546 (2006)

13. **Studies of silicon photodetectors for scintillator-based hadron calorimetry at the International linear Collider**, D. Beznosko *et.al.*, *Nucl. Instr. Meth. A* **567**: 62 (2006)

14. **LCDG4 and DigiSim: simulation activities at NICADD/NIU**, D. Beznosko *et.al.*, *ArXiv:0507204 [physics]* and *Proc. of the 2005 Int. Lin. Coll. Workshop (LCWS 2005)*, Stanford CA (2005)

15. **Towards a scintillator based digital hadron calorimeter for the Linear Collider Detector**, A. Dyshkant *et.al.*, *IEEE Trans. Nucl. Sci.* **51**: 1590-1595 (2004)

16. **Small-angle muon and bottom-quark production in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ TeV**, B. Abbott et al. (DØ Collaboration), *Phys. Rev. Lett.* **84**: 5478-5483 (2000)

17. **Inclusive μ and b-quark production cross-sections in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ TeV**, S. Abachi *et.al.* (DØ Collaboration), *Phys. Rev. Lett.* **74**: 3548-3552 (1995)

18. **Observation of the top quark**, S. Abachi *et.al.* (DØ Collaboration), *Phys. Rev. Lett.* **74**: 2632-2637 (1995)

19. **Study on the Inclusive Production Cross Section of Forward Muons in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ TeV**, J.G.R. Lima, *Ph.D. Thesis*, CBPF, Brazil (1995) 104 pp.

20. **Study of the doubly Cabibbo-suppressed decay $D^+ \to \phi K^+$ and the singly Cabibbo-suppressed decay $D_s^+ \to \phi K^+$**, J.C. Anjos *et.al.* (TPS Collaboration), *Phys. Rev. Lett.* **69**: 2892 (1992)